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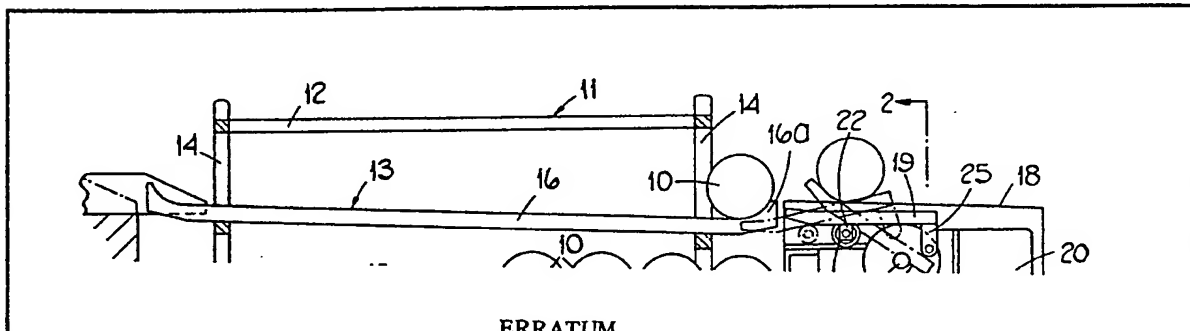
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## (54) Apparatus for Handling Elongate Cylindrical Articles

(57) This invention relates to apparatus for handling elongate cylindrical articles such as tubes or bars, the apparatus comprising a pallet (11) and

at least one delivery station (17) having power-actuated article discharge means (19, 20, 21, 22, 23, 24, 25, 26), said pallet having a plurality of article supporting platforms (13) which each comprise a plurality of platform members (16) which are inclined to the horizontal, the in situ lower ends of said platform members (16) having fixed abutment means (16a) which prevent articles placed on a platform in the pallet from rolling off the platform, said article discharge means being arranged when actuated to lift an article engaged by said fixed abutment means over the fixed abutment means and on to the associated delivery station.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.



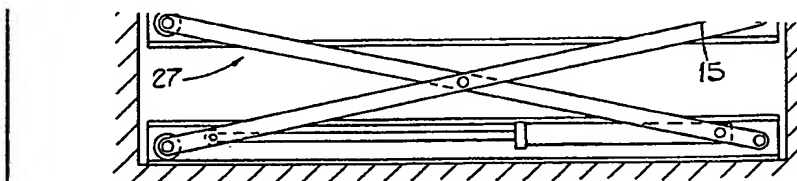
ERRATUM

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Front page, heading (56) Documents cited for GB 982626 read GB 982636

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FIG.1.

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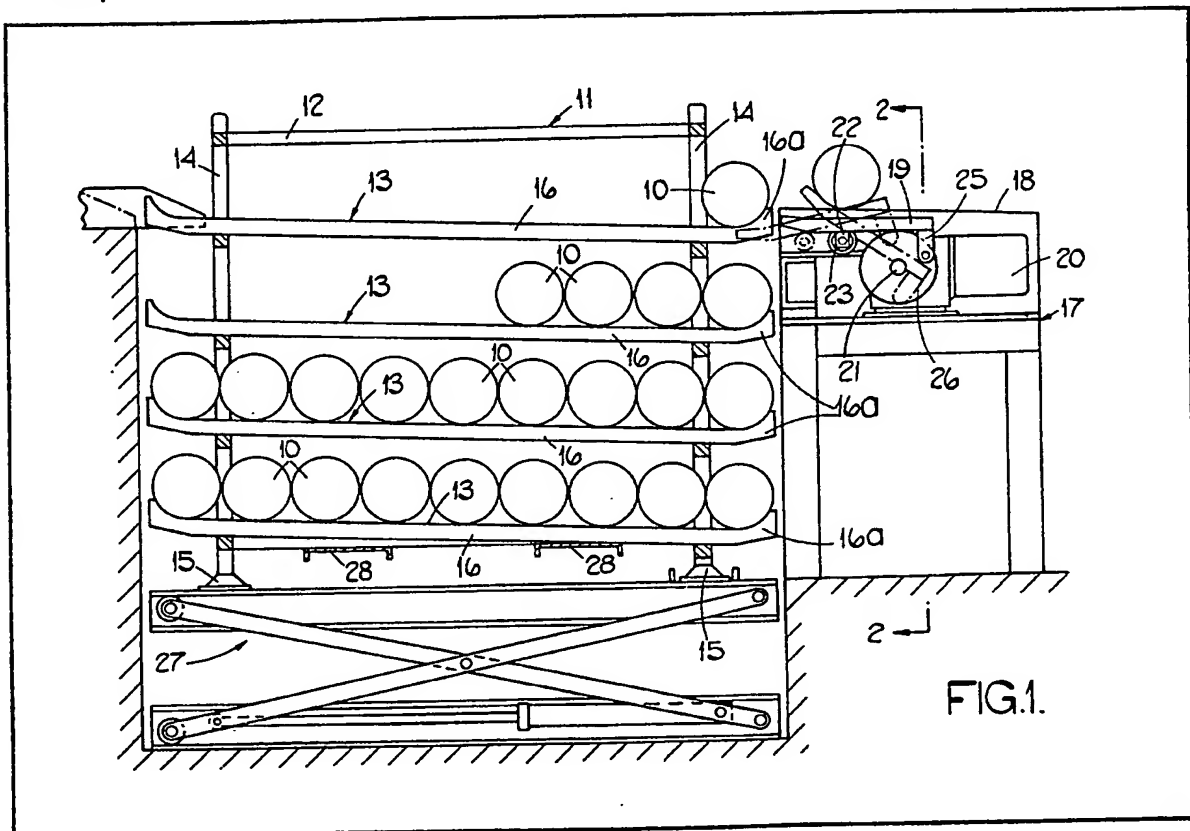
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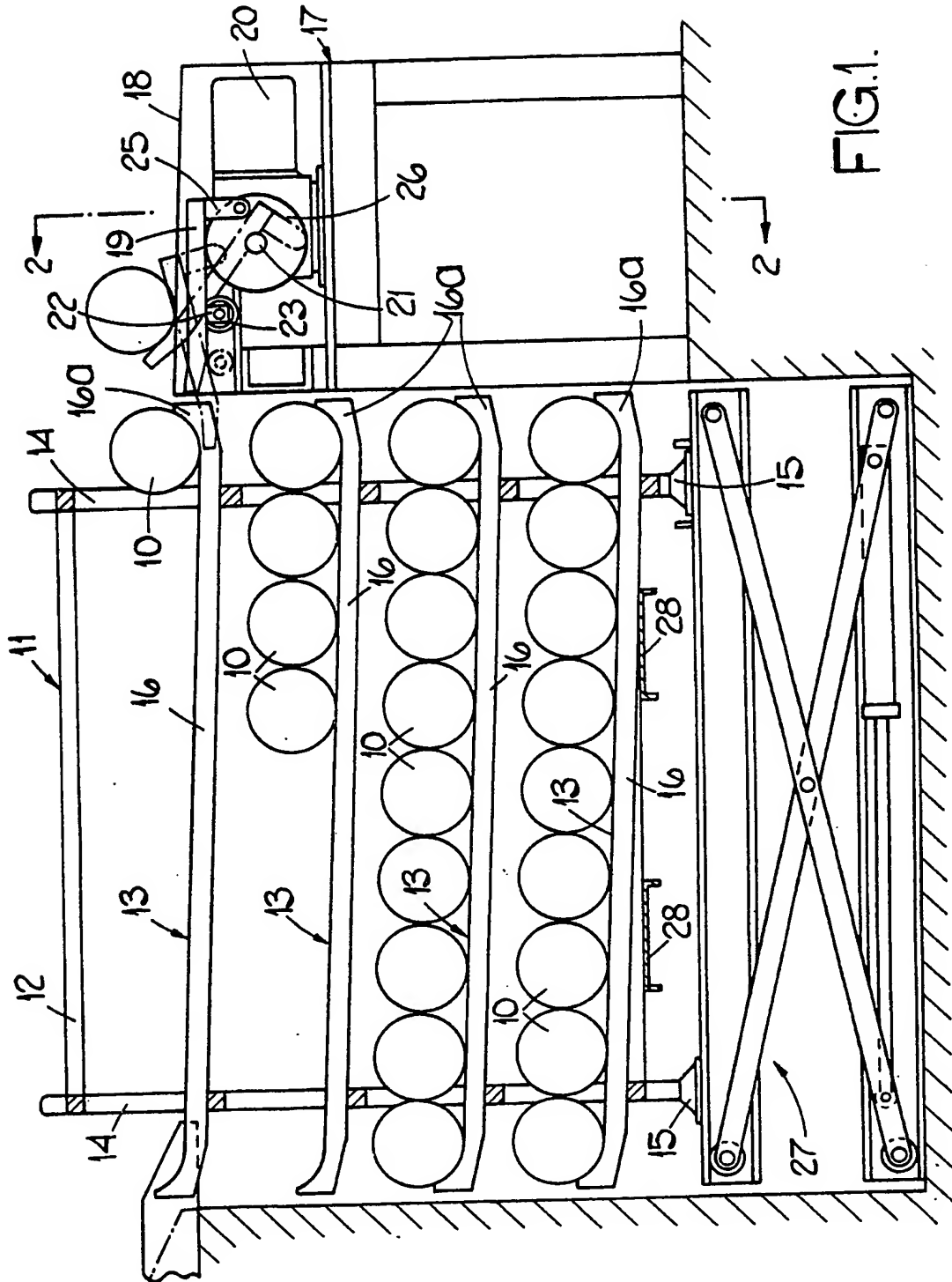
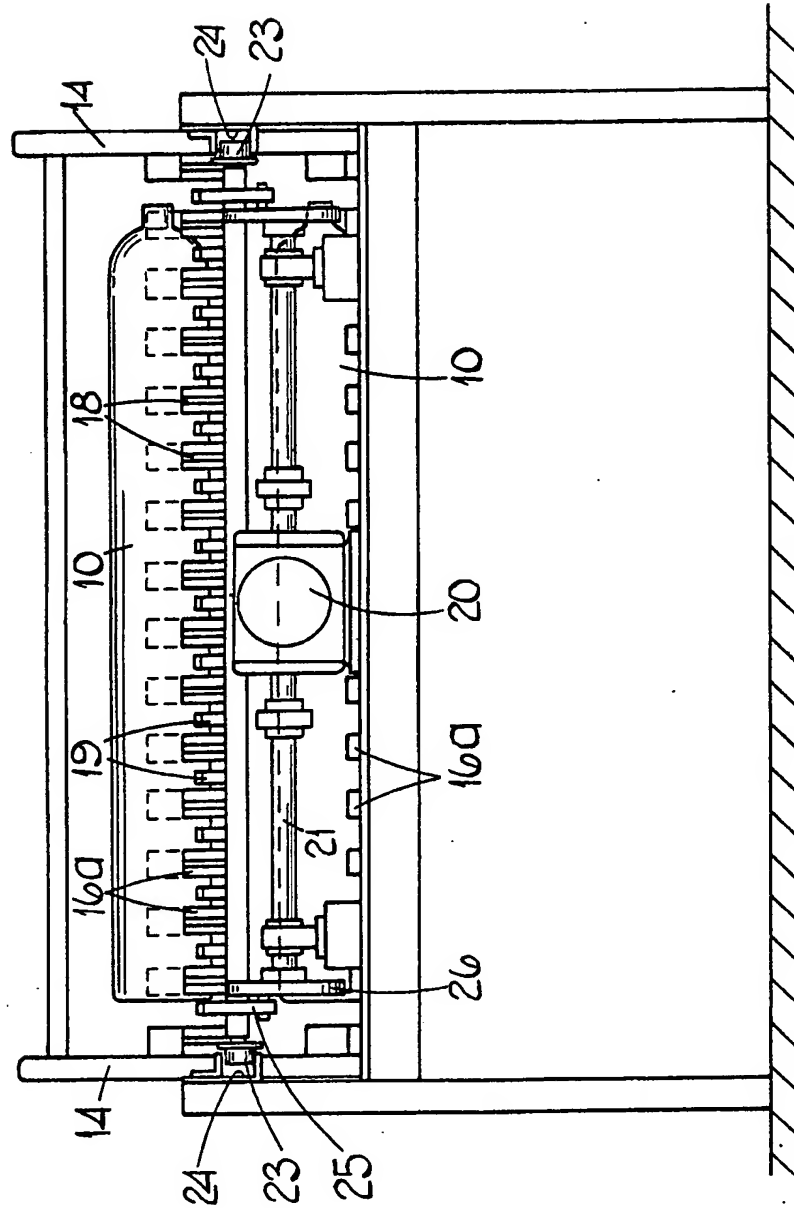


FIG. 1.

FIG.2.



## SPECIFICATION

## Apparatus for Handling Elongate Cylindrical Articles

5 This invention relates to apparatus for handling elongate cylindrical articles such as cylindrical bars or tubes and has as its object the provision of such apparatus in an improved form.

10 In accordance with the invention there is provided apparatus for handling elongate cylindrical articles comprising a pallet having a frame and a plurality of article supporting platforms which each comprise a plurality of platform members arranged in a spaced parallel relationship and disposed so that when the pallet 15 is standing on a level horizontal surface the length of said members will be inclined to the horizontal so that a cylindrical article placed on the higher end of said platform will roll or tend to roll towards the lower end thereof, the lower 20 ends of said platform members being provided with fixed abutment means to prevent said articles from rolling off said lower end of the platform and there being also provided at least one delivery station, the or each station having 25 article discharge means comprising an article supporting surface and a plurality of spaced parallel fingers which are movable by power-actuated means towards and away from said spaced platform members so that the free ends of 30 said fingers can extend between the platform members and beneath an article engaging said fixed abutment means and then lift said article over the fixed abutment means to deposit it on to said article supporting surface.

35 The plurality of article supporting platforms are conveniently arranged in a spaced vertical relationship and in this case there may be provided at the or each delivery station lifting means which can be operated to bring each 40 platform of a pallet in turn to an appropriate height at which the aforementioned article discharge means can be used to remove articles from the pallet.

45 The invention will now be more particularly described with reference to the accompanying drawings wherein

Figure 1 is an elevation, partly in section, of one example of article handling apparatus in accordance with the invention, and

50 Figure 2 is a view taken on the line 2—2 of Figure 1.

Referring to the drawings, the apparatus shown therein is intended for use in handling elongate cylindrical articles such as cylindrical tubes or bars which are indicated by reference numeral 10.

60 The apparatus includes a pallet 11 which comprises a frame 12 together with a plurality of article supporting platforms 13 which are supported by said frame in a vertically spaced relationship. The frame 12 includes a plurality of upright members 14 having feet 15 at their lower ends and conveniently the feet are formed in a manner which will permit them to be engaged

65 with the upper ends of the upright members of a similar pallet so that a plurality of pallets can be stored, if desired, in a vertically stacked relationship.

Each platform of the pallet comprises a 70 plurality of platform members 16 of elongate form arranged in a spaced, parallel relationship, said members being connected to the pallet frame 12 so that when the pallet is disposed on a level horizontal surface the length of said members will 75 be inclined to the horizontal as seen in Figure 1. Furthermore at each end each of said platform members 16 projects outwardly beyond the pallet frame 12 so that the two ends of each platform 80 13 will be readily accessible from outside the frame. A cylindrical article 10 which is placed on the upper or higher end of a platform so that its axis extends in a horizontal direction perpendicular to the length of the platform 85 members will thus roll or tend to roll towards the lower end of the platform. Furthermore each of said platform members is shaped so that its lower end 16a has an upwardly projecting portion which provides fixed abutment means to prevent 90 said articles from rolling off said lower end of a platform.

The apparatus now described also includes at least one delivery station generally indicated by reference numeral 17, the or each station having article discharge means which is arranged to 95 remove the lowermost article 10 from a platform when it is desired, for example, to perform an operation on such article. Said article discharge means comprises an article supporting surface which comprises a plurality of spaced, parallel 100 support members 18 together with a plurality of interspaced, parallel fingers 19 forming a comb which is connected to power-actuated means in the form of an electric motor 20 which is arranged to drive a worm wheel and worm shaft 105 21, the latter being operatively connected to the aforesaid fingers (which are themselves conveniently connected together in a kind of frame or comb as aforesaid), whereby actuation of said electric motor will result in an oscillatory or rotational movement of said comb. Thus, said 110 fingers 19 are connected to an elongate member 22 (see Figure 2) supported at each end on a roller 23 which runs in an associated track 24.

To the opposite ends of said member 22 are 115 connected a pair of drop arms 25 which are pivotally and eccentrically connected respectively to a pair of discs 26 (or cranks) which are connected to the opposite ends of said worm shaft 21 so as in use to be rotated thereby. The 120 fingers 19 are so disposed that they are spaced apart at a pitch equal to the pitch by which the aforementioned platform members 16 are spaced apart, the outer or free ends of said fingers being adapted to be moved, on actuation of said electric 125 motor 20, towards and away from the lower ends of said platform members 16 whereby said outer or free ends of the fingers can extend between the lower ends of the platform members and beneath the lowermost articles 10 supported thereby.

Thus, when it is desired to remove the lowermost article 10 from a platform of the pallet the aforementioned electric motor 20 will be energised to cause the finger comb to extend into the lower end of the platform between the members thereof whereafter said fingers 19 will lift slightly to raise said lowermost article clear of the abutment means 16a and then deposit it on said article supporting surface formed by the upper edges of said members 18. Said surface conveniently forms part of or forms an extension of an operating surface of a machine which is to be used for performing an operation on the article and after such an operation has been performed the article can be placed either manually or by further power actuated means (which may for example comprise a further oscillatable or rotatable finger comb) into another, similar, pallet which could be arranged on the opposite side of the aforesaid discharge means. Thus, articles would be taken one by one from the firstmentioned pallet, an operation or operations would be performed on each article as desired, and the articles would then be placed in the receiving pallet for further transport when desired. In Figure 2 Incidentally, there can be seen an article 10 from each of the two uppermost platforms 13 of the pallet 11.

Conveniently, there is also provided in association with the above described apparatus lifting means 27 which may for example comprise a so-called scissors lift which can be set in the floor and which can be operated when desired, so as to raise any particular platform 13 to the appropriate level at which the aforementioned article discharge means can be used to remove articles from the pallet. Furthermore, each pallet would be provided along its base with locating

means 28 for receiving the forks of a forklift truck whereby the pallet can be transported.

#### Claims

1. Apparatus for handling elongate cylindrical articles comprising a pallet having a frame and a plurality of article supporting platforms which each comprise a plurality of platform members arranged in a spaced parallel relationship and disposed so that when the pallet is standing on a level horizontal surface the length of said members will be inclined to the horizontal so that a cylindrical article placed on the higher end of said platform will roll or tend to roll towards the lower end thereof, the lower ends of said platform members being provided with fixed abutment means to prevent said articles from rolling off said lower end of the platform and there being also provided at least one delivery station, the or each station having article discharge means comprising an article supporting surface and a plurality of spaced parallel fingers which are movable by power-actuated means towards and away from said spaced platform members so that the free ends of said fingers can extend between the platform members and beneath an article engaging said fixed abutment means and then lift said article over the fixed abutment means to deposit it on to said article supporting surface.

2. Apparatus as claimed in Claim 1 wherein each of said platform members is shaped so that its lower end is upturned to form said fixed abutment means which is integral with the associated platform member.

3. Apparatus for handling elongate cylindrical articles substantially as hereinbefore described with reference to and as shown in the accompanying drawings.